

Low-Dispersion Quick-Look Sensitivity Monitoring

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Introduction/Analysis

The low-dispersion sensitivity monitoring analysis for the LWP, LWR, and SWP cameras has been updated to June 1991. The following stars are used to monitor changes in camera sensitivity:

BD+28° 4211, HD 93521, HD60753, BD+33° 2642, BD+75° 325.

The symbols for each star are, respectively:

+ , * , ◇ , □ , △ . ,

The sensitivity data are analyzed using the standard methods as described by Holm and Schiffer (1980). The database consists of several hundred observations of the five standard stars. The flux data are ratioed to a reference spectrum for each star (Table 1) and separated into several wavelength bins, each 150Å wide (300Å for the LWR). The binned flux ratios are then fit with a multiple linear regression to find the time rate of change (%/yr.) in each wavelength region and the overall temperature dependence (%/°C) of the camera. The temperature coefficient is assumed to be time independent and is fit to the head amplifier temperature (THDA). The temperature and time dependent coefficients for the three cameras are listed in Table 2. The data are normalized to 1978 and corrected for camera temperature dependence before being plotted in Figures 1-4.

Table 1.

Reference Stars used for normalization

STAR	LWP	date	LWR	date	SWP	date
BD+28° 4211	3688	1984.5	1712	1978.5	2139	1978.6
HD 93521	3535	1984.4	1589	1978.4	1955	1978.5
HD 60753	3689	1984.5	1642	1978.4	1752	1978.3
BD+33° 2642	3610	1984.5	2137	1978.6	4003	1979.1
BD+75° 325	3537	1984.4	2748	1978.8		

Results

The LWP degradation remains quite linear since the 1984 - 1985 epoch when it became the primary camera. The apparent increase in the rate of degradation, most evident in the short wavelength end of the camera, is due to the 1984.5 jump in sensitivity. The LWR

camera continues to show some slowing in the degradation rates after its decommissioning. The rate of SWP degradation has remained relatively stable over the past several years.

The THDA's for each observation are plotted in Figure 5. The statistical increase in camera temperatures is less than 1%/yr. when the least-squares analysis of the data is restricted to dates after 1981 (1983 for the LWP).

References

- Holm, A.V., and Schiffer, F.H. 1980, *NASA IUE Newsletter*, **9**, 8.
Garhart, M.P. 1990, *NASA IUE Newsletter*, **41**, 213.

Table 2.

Results of low dispersion camera sensitivity analysis - June 1991

LWP CameraTemperature dependence = -0.21 ± 0.02 [$\frac{\%}{^{\circ}\text{C}}$]

536 data points used in regression

Time Dependence [$\frac{\%}{\text{yr.}}$]

Wavelength Region (\AA)	1980.4 to					
	1991.4	1990.3	1989.2	1988.4	1987.7	1986.4
2075 - 2225	-0.77 ± 0.03	-0.63 ± 0.04	-0.33 ± 0.05	$+0.01 \pm 0.07$	$+0.16 \pm 0.08$	$+0.56 \pm 0.12$
2225 - 2375	-1.34 ± 0.03	-1.25 ± 0.04	-1.07 ± 0.05	-0.87 ± 0.07	-0.73 ± 0.08	-0.52 ± 0.12
2375 - 2525	-1.25 ± 0.03	-1.16 ± 0.04	-0.97 ± 0.05	-0.74 ± 0.07	-0.61 ± 0.08	-0.43 ± 0.12
2525 - 2675	-1.23 ± 0.03	-1.18 ± 0.04	-1.04 ± 0.05	-0.87 ± 0.07	-0.74 ± 0.08	-0.45 ± 0.12
2675 - 2825	-1.12 ± 0.03	-1.08 ± 0.04	-0.96 ± 0.05	-0.83 ± 0.07	-0.72 ± 0.08	-0.50 ± 0.12
2825 - 2975	-0.90 ± 0.03	-0.88 ± 0.04	-0.75 ± 0.05	-0.57 ± 0.07	-0.47 ± 0.08	-0.27 ± 0.12

LWR CameraTemperature dependence = -0.89 ± 0.04 [$\frac{\%}{^{\circ}\text{C}}$]

399 data points used in regression

-5.0 kV UVC = 309 data pts.

-4.5 kV UVC = 90 data pts.

Time dependence [$\frac{\%}{\text{yr.}}$]

Wavelength Region (\AA)	1978.4 to					
	1991.4	1990.3	1988.1	1987.7	1986.4	1985.3
2250 - 2550	-1.85 ± 0.03	-1.90 ± 0.04	-2.06 ± 0.04	-2.34 ± 0.05	-2.49 ± 0.08	-2.23 ± 0.10
2550 - 2650	-1.48 ± 0.03	-1.47 ± 0.04	-1.51 ± 0.04	-1.65 ± 0.05	-1.73 ± 0.08	-1.69 ± 0.10
2750 - 3050	-1.32 ± 0.03	-1.34 ± 0.04	-1.34 ± 0.04	-1.55 ± 0.05	-1.73 ± 0.08	-1.84 ± 0.10

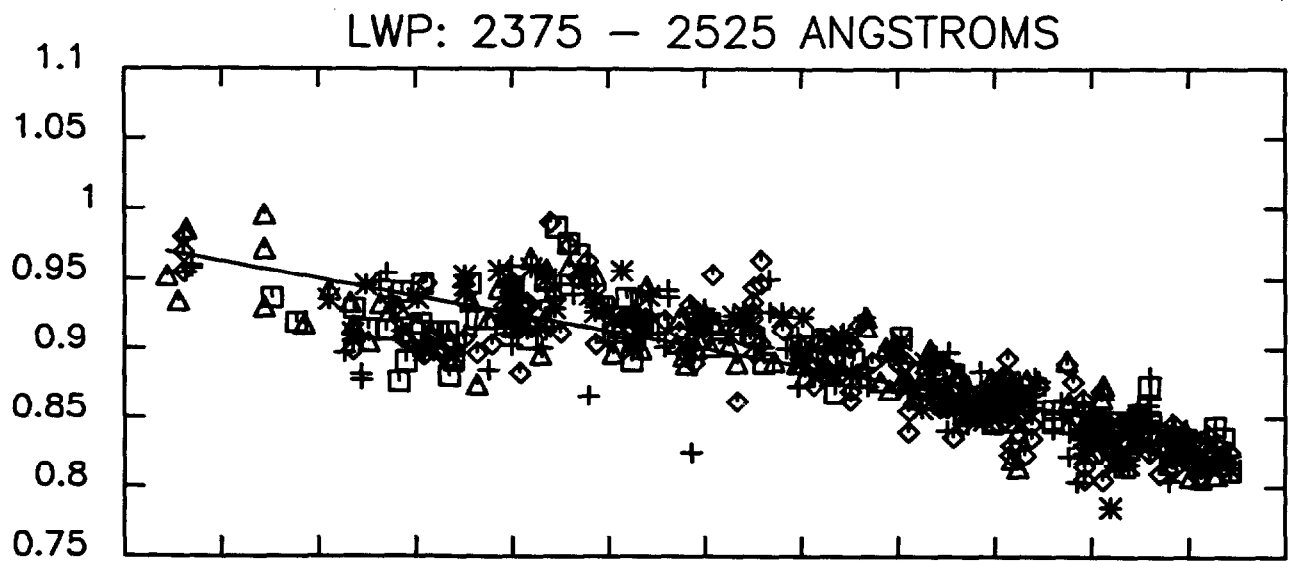
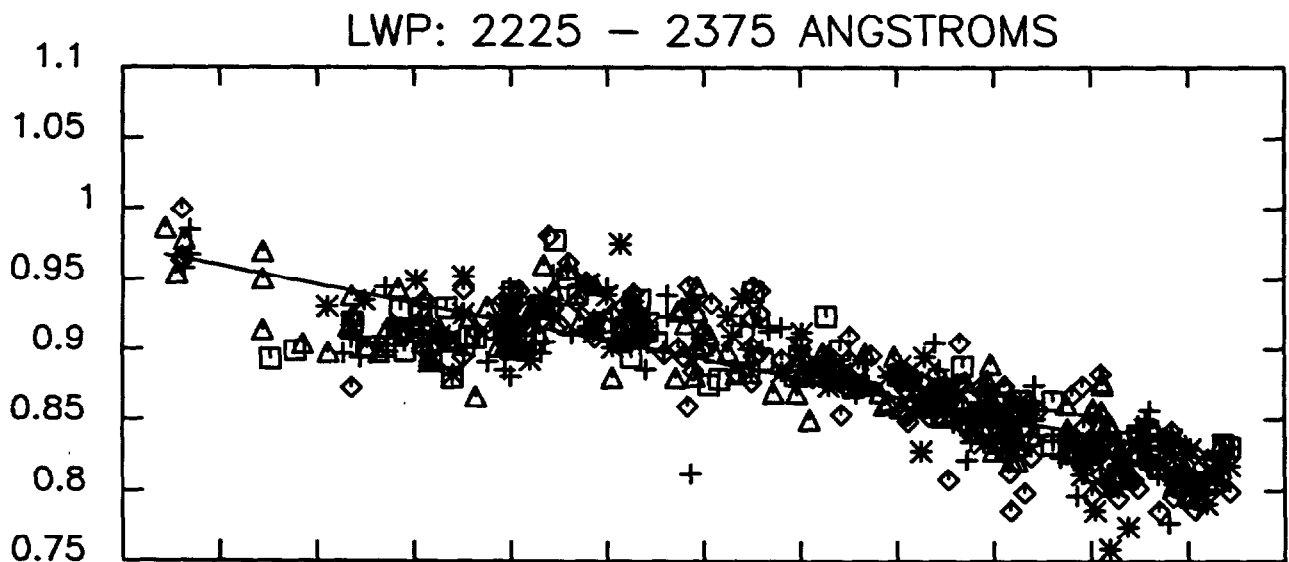
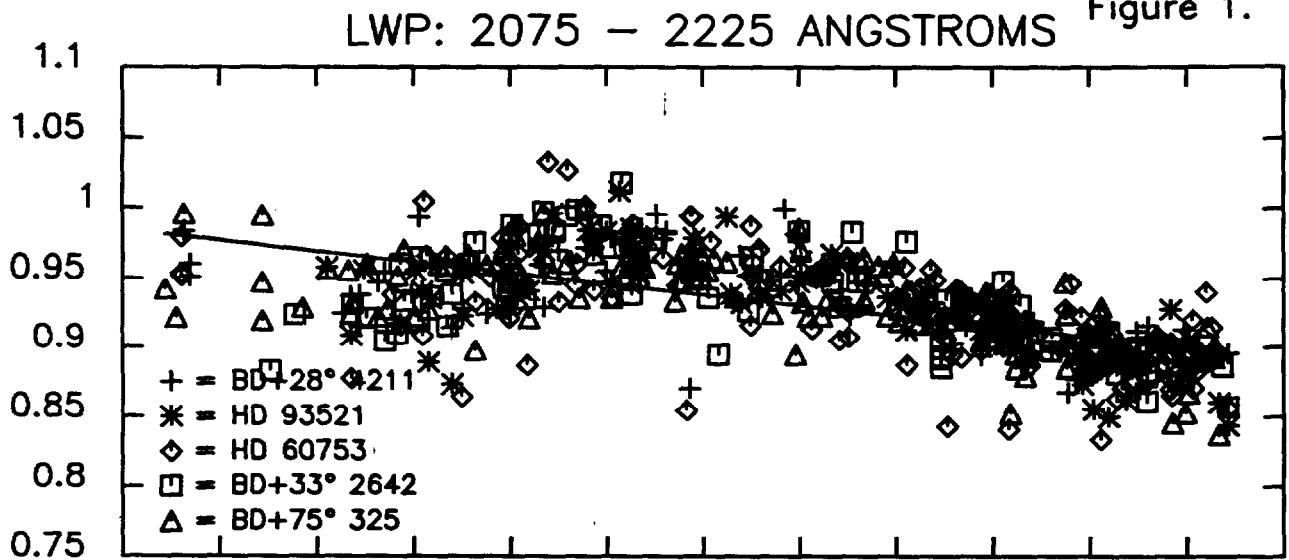
SWP CameraTemperature dependence = -0.45 ± 0.03 [$\frac{\%}{^{\circ}\text{C}}$]

511 data points used in regression

Time dependence [$\frac{\%}{\text{yr.}}$]

Wavelength Region (\AA)	1979.5 to					
	1991.4	1990.3	1989.2	1988.7	1987.7	1986.3
1225 - 1375	-0.79 ± 0.02	-0.83 ± 0.03	-0.79 ± 0.03	-0.75 ± 0.04	-0.69 ± 0.04	-0.66 ± 0.06
1475 - 1625	-0.51 ± 0.02	-0.53 ± 0.03	-0.50 ± 0.03	-0.47 ± 0.04	-0.38 ± 0.04	-0.22 ± 0.06
1775 - 1925	-0.76 ± 0.02	-0.80 ± 0.03	-0.79 ± 0.03	-0.79 ± 0.04	-0.78 ± 0.04	-0.69 ± 0.06

Figure 1.



1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992

Figure 2.

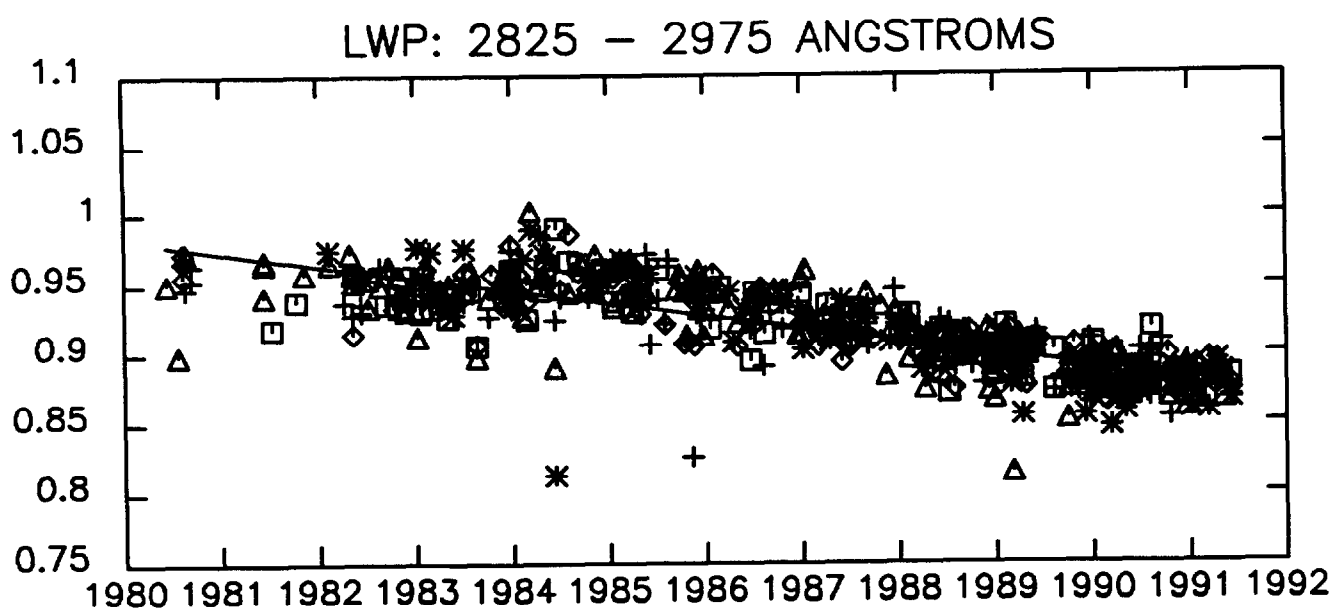
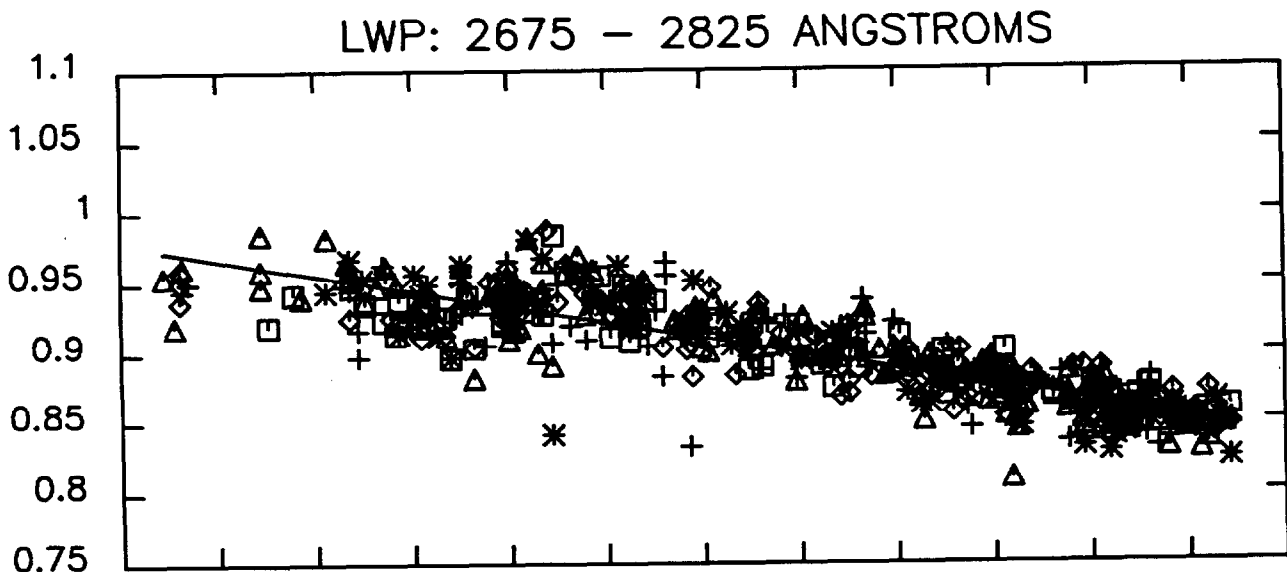
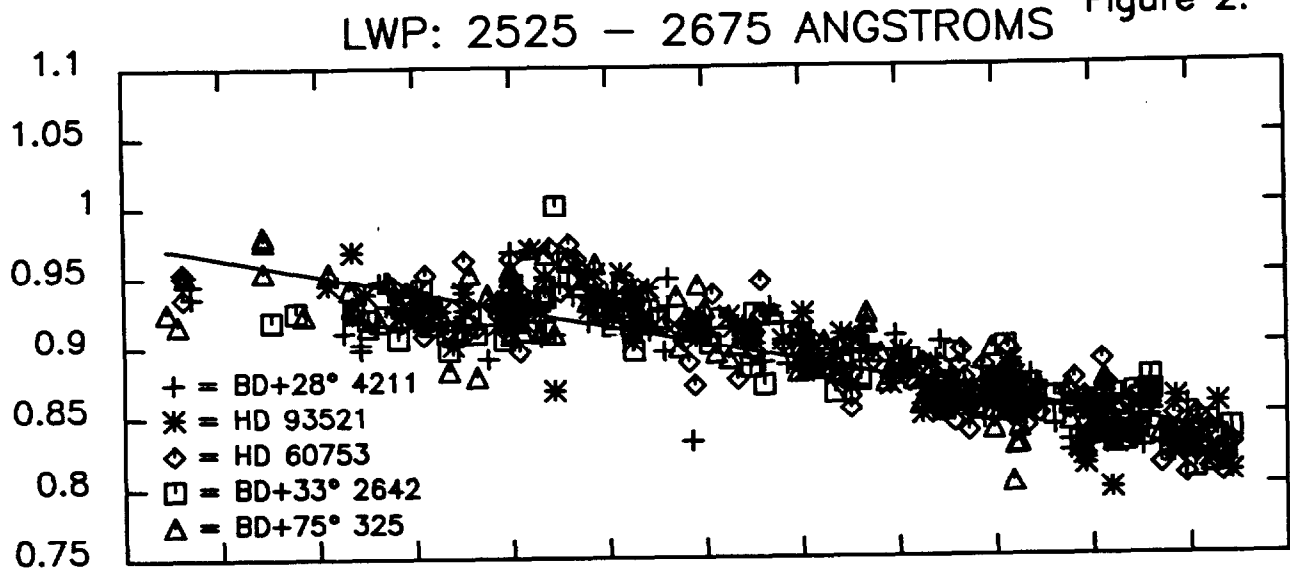
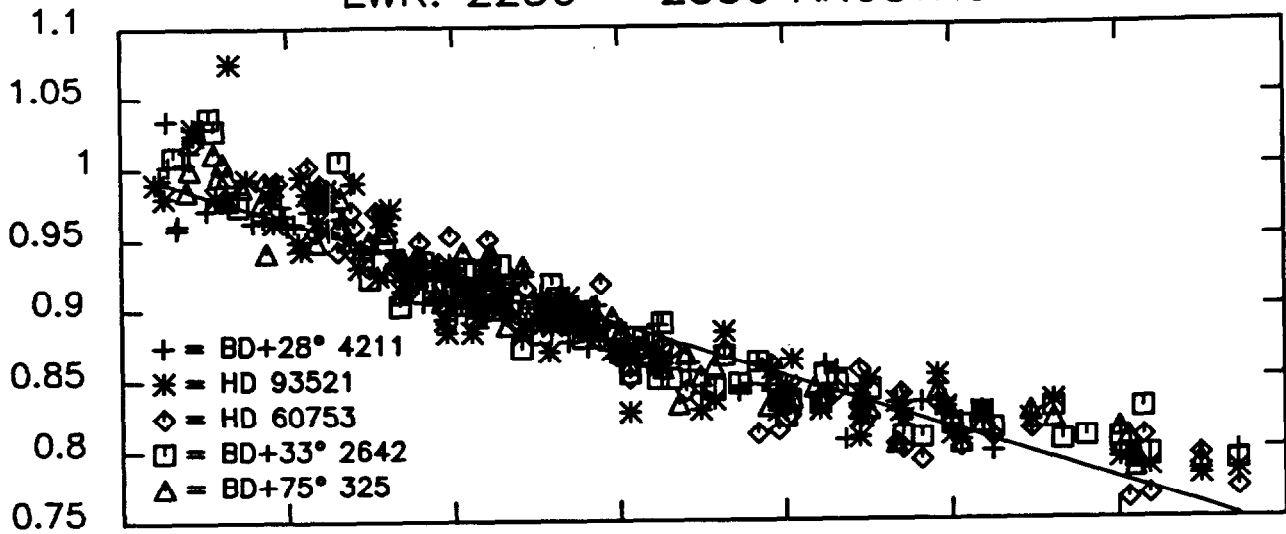
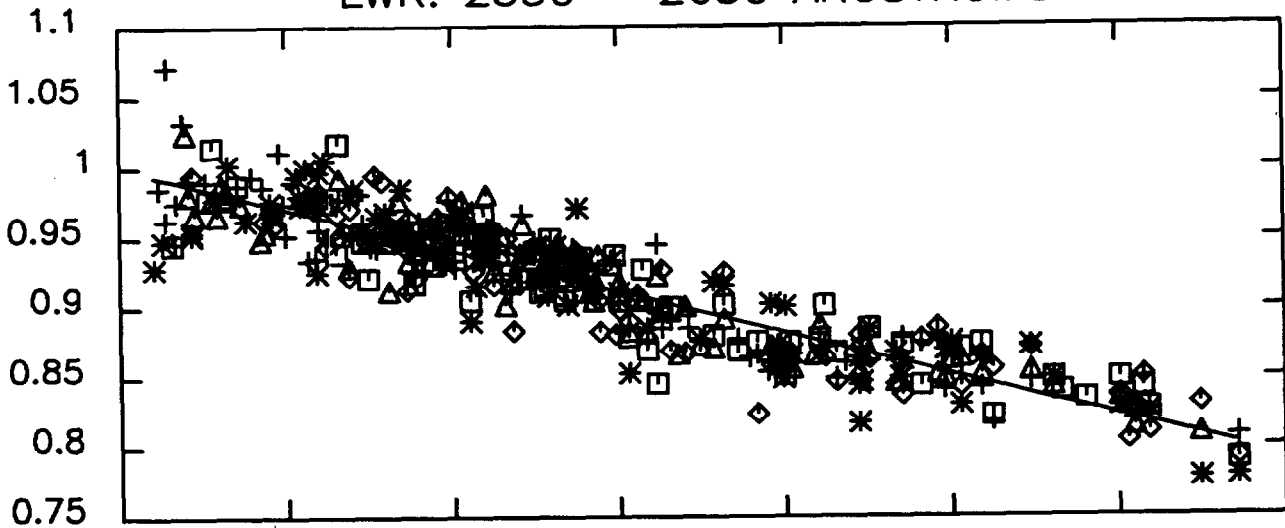


Figure 3.

LWR: 2250 - 2550 ANGSTROMS



LWR: 2550 - 2650 ANGSTROMS



LWR: 2750 - 3050 ANGSTROMS

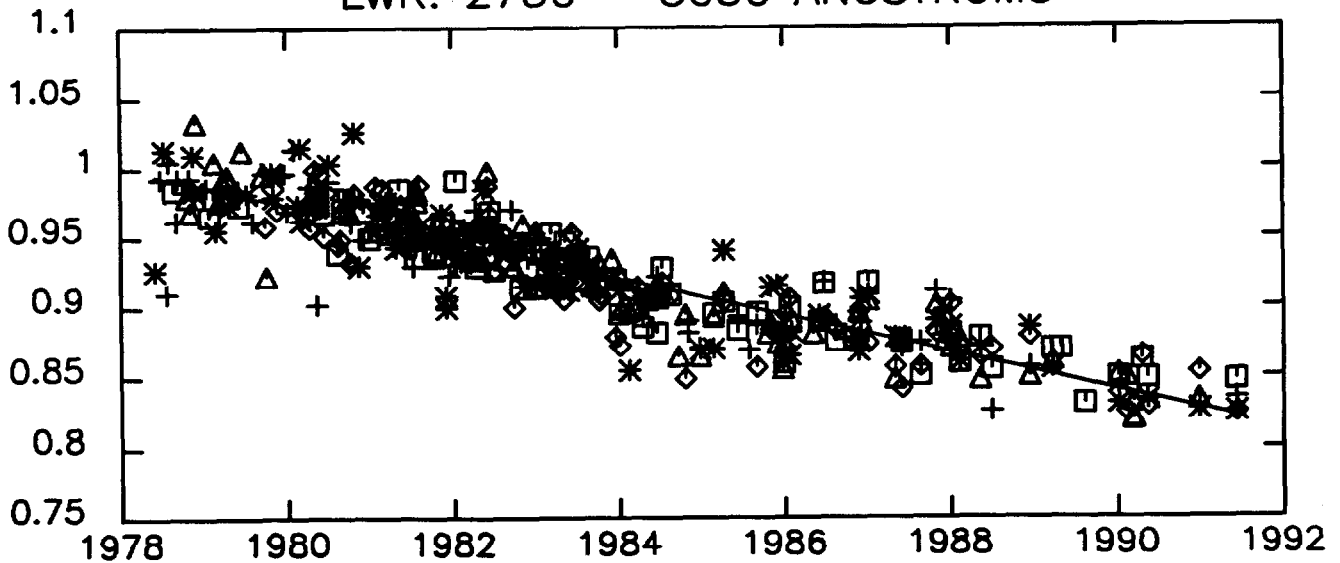
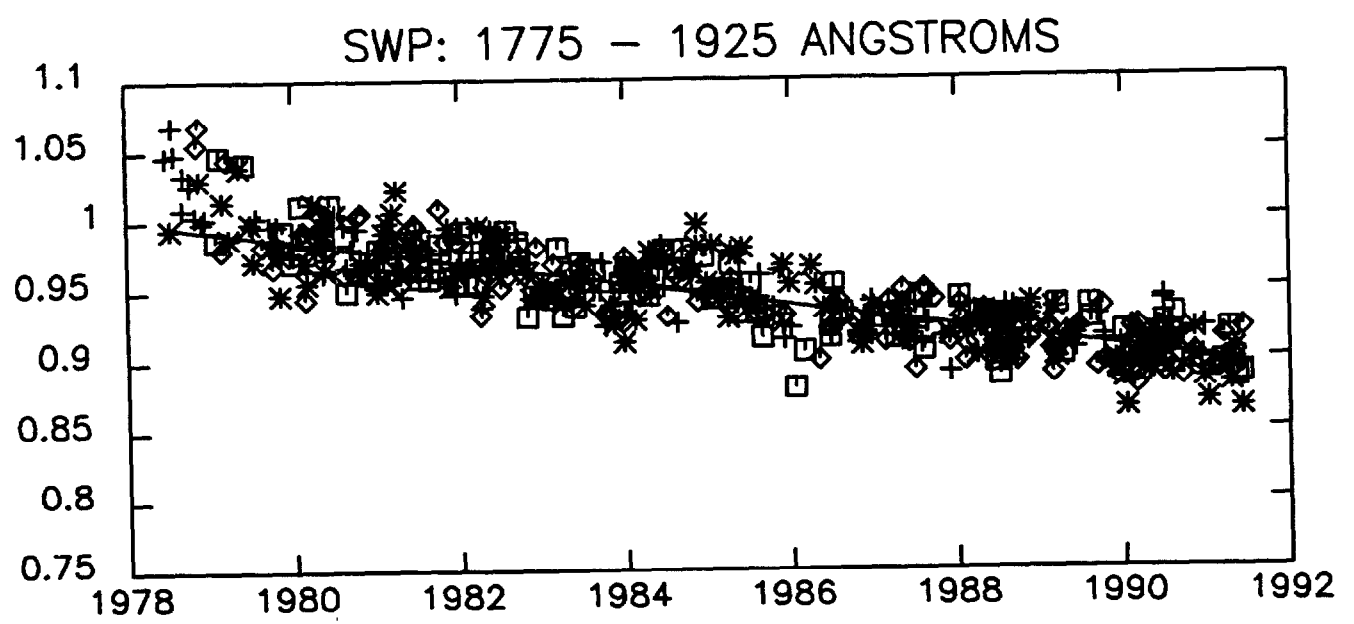
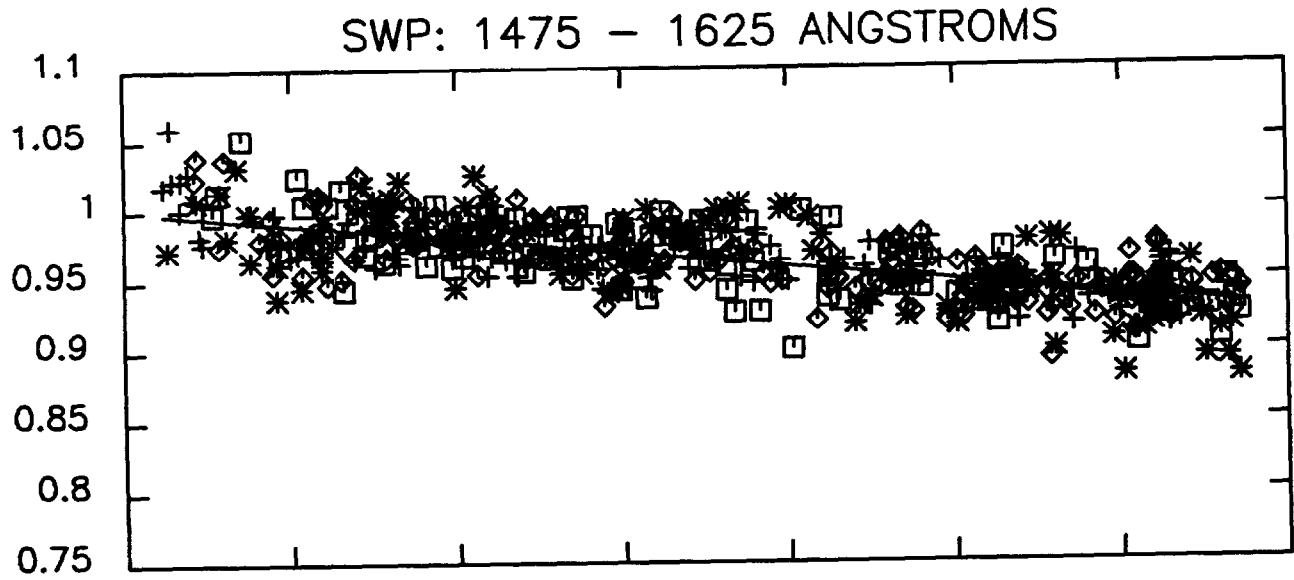
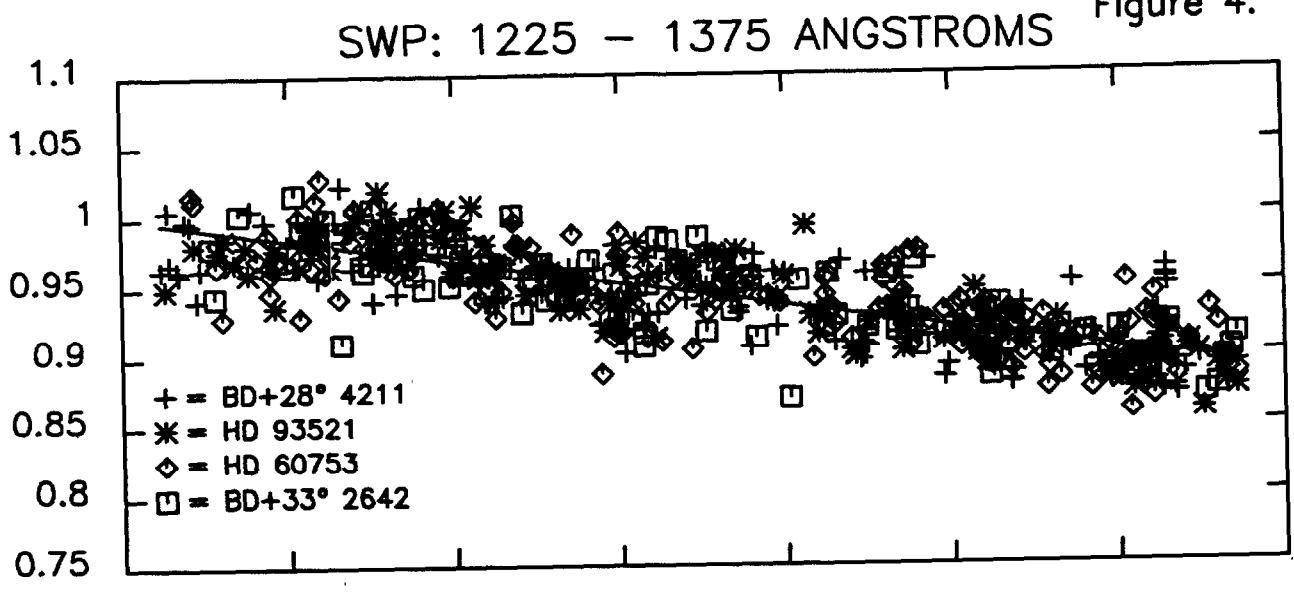


Figure 4.



HEAD AMPLIFIER TEMPERATURES Figure 5.

